

GYANMANJARI INNOVATIVE UNIVERSITY

GYANMANJARI INSTITUTE OF TECHNOLOGY

B.Tech.-Mid Semester Examination (MSE)-W2025

Enrollment No.: _____

Subject Code: BETCE15313

Subject Name: Analysis and Design of Algorithm

Time: 02:30 PM to 04:30 PM

Date: 08-09-2025

Semester: 5

Total Marks: 60

Instructions:

1. Question No. 1 is compulsory.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		Marks
Q.1	(a) Define: P, NP, NP hard, and NP complete using Venn diagram.	05
	(b) Find out the time complexity for the following pseudo code using O-notation (big-oh). (i) for (i=0; i<n; i++) { for (j=n; j>0; j--) { If (i<j) c=c+1; } }	05
	State whether the statements are correct or incorrect with reasons. 1. $O(f(n)) + O(f(n)) = O(2f(n))$ 2. If $3n + 5 = O(n^2)$, then $3n + 5 = o(n^2)$	
	(c) Explain asymptotic analysis with all the notations with example.	10
Q.2	(a) A greedy strategy will work for fractional Knapsack problem but not for 0/1", is this true or false? Explain with example.	05
	(b) Explain spurious hits in Rabin-Karp string matching algorithm with example. Working modulo $q=13$, how many spurious hits does the Rabin- Karp matcher encounter in the text $T = 2359023141526739921$ when looking for the pattern $P = 31415$?	05

OR

(b) How divide and conquer approach work? Give example and also compare it with Greedy algorithm. 05

(c) Explain the Master theorem. Solve following recurrence using it. 10

(i) $T(n) = T(n/2) + 1$

(ii) $T(n) = 2T(n/2) + n \log n$

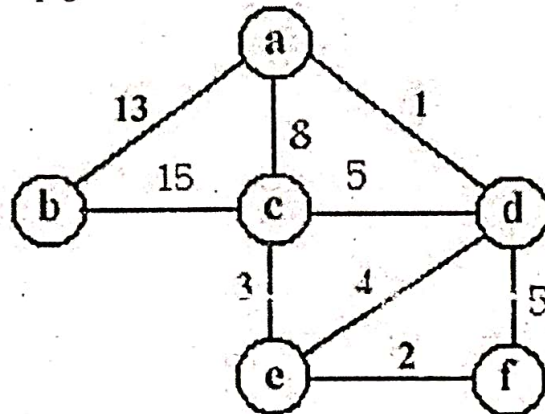
OR

(c) Sort the following list using quick sort algorithm using Divide and Conquer method: <50, 40, 20, 60, 80, 100, 45, 70, 105, 30, 90, 75> Also write down an algorithm for it. 10

Q.3 (a) Sort the best case running times of all these algorithms in a non-decreasing order with their Time Complexity. Quick-Sort, Merge-Sort, Heap-Sort, Selection-Sort, Insertion-Sort, Bucket-Sort, Strassen's Algorithm, Exponential. 05

(b) Implementation and Time analysis of Binary Search Algorithm. 05

(c) Apply Kruskal's algorithm on the given graph and step by step generate the MST.



OR

Q.3 (a) Generate Huffman Code for symbols with probability as A1(0.5), A2(0.25), A3(0.125), A4(0.0625), A5(0.0625). 05

(b) Write an algorithm of Merge Sort Method. 05

Find minimum spanning tree for the given graph in below fig using prim's Algorithm.

